

Work Order ID 69296

Friday, May 06, 2011 3:46:46 PM

Page 1

Item ID: D412-664-203

Accept

Setup Start

Revision ID:

Stop

Item Name: Crosstube Aft

Start Date: 5/9/2011 Start Qty: 1.00

Required Date: 5/27/2011 Req'd Qty: 1.00

Cust Item ID:

Customer:

Reference:

Approvals:

Process Plan: *MF*

Date: *11-05-06*

Tooling:

Date:

QC:

Date:

SPC (Y/N):

Date:

Run Start

Stop

Sequence ID/
Work Center ID

Operation
Description

Set Up/
Run Hours

Tool ID

Tool #

Plan
Code

Accept
Qty

Reject
Qty

Reject
Number

Insp.
Stamp

Draw Nbr

Revision Nbr

D412-664-243

E

0.00

100



DOCUMENT CONTROL

DC

Memo

0.00

Document Control

Photocopy bluefile and create labels as per PPP D412-664-203 CHG 006

CHG 006

8/11/07

0.00

110



Packaging

Packaging

Memo

0.00

Packaging

DP

11-5-7

0.00

120



BENDING MACHINE - CROSSTUBES

CNC Bend 2

Memo

0.00

CNC Alpha 160 Bender

Bend tube as per Dwg D412-664-243 using CNC bender program 412-aft and Folio FT010

DP

11-5-7

W/O:		WORK ORDER CHANGES						
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector	

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
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NOTE: Date & initial all entries

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QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Run Start

Stop

Sequence ID/
Work Center IDOperation
DescriptionSet Up/
Run Hours

Tool ID

Tool #

Plan
CodeAccept
QtyReject
QtyReject
NumberInsp.
Stamp

130

QC15- Crosstube Dimensional Check

0.00



QC

Memo

0.00

Quality Control

140

Crosstubes

0.00



Crosstubes

Memo

0.00

Crosstubes

1-Drill pilot holes in tube as per Dwg D412-664-243 using drill Jig DT8550 & DT8551 and drill table DT8577 using #9 holes as per QSI-10 to install towers.

2-Ream hole to finish size in tube as per Dwg D412-664-243 using drill Jig DT8550 & DT8551. Check dimensions between holes, both sides on both cuffs, to ensure alignment with saddle holes.

3-SCRIBE PART # & BATCH #

4-Deburr & Inspect for surface damage. Repair damage within limits as per Dwg D412-664-243

SAD
11-05-09

11-5-9

W/O:		WORK ORDER CHANGES						
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QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop

Sequence ID/
Work Center IDOperation
DescriptionSet Up/
Run Hours

Tool ID

Tool #

Plan
CodeAccept
QtyReject
QtyReject
NumberInsp.
Stamp

150

Crosstubes Chemical Conversion

0.00



0.00

HandFXtube

Memo

Hand Finishing Crosstubes

SAD

11-05-16

①

160

QC3- Inspect Part Finish

0.00



0.00

QC

Memo

Quality Control

S u l o s t u o

170

QC5- Inspect part completeness to step on W/O

0.00



0.00

QC

Memo

Quality Control

S u l o s t u o

A00

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Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES						
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector	
11-05-11	210	prime + clean 2" strip on inside of ess tube staying 2" away from cuff				<i>[Signature]</i> 11/15/13	<i>[Signature]</i> 11/15/13	

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

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Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Run Start



QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop

Sequence ID/
Work Center IDOperation
DescriptionSet Up/
Run Hours

Tool ID

Tool #

Plan
CodeAccept
QtyReject
QtyReject
NumberInsp.
Stamp

230

0.00



Crosstubes

Crosstubes

Memo

0.00

Crosstubes

Assemble as per Dwg D412-664-203

1- Lightly scuff the bonded area using a 320 grit sand paper and clean the area with 41058 wash 'n' wipe

2-Install support with magnobond as per QSI 015 Adhere for 12 Hrs

A/R 6398 Magnobond Batch: 116677
Expiry Date: 11 08

3-Install chafing shield and clamps as per DEO D412-664-243 using installaiton jig DT9024 Torque clamps to 80-100 in lb.

A/R Proseal batch: 11751025 11-05-12

240

0.00



QC

QC5- Inspect part completeness to step on W/O

Memo

0.00

Quality Control

811651311

W/O:		WORK ORDER CHANGES						
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Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Run Start



QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop



Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
--------------------------------	--------------------------	----------------------	---------	--------	--------------	---------------	---------------	------------------	----------------

250

Pick Kit

0.00



Packaging

Memo

0.00

Packaging

11/5/13

260

QC4- 100% Inspect kits for completeness

0.00



QC

Memo

0.00

Quality Control

8/11/05/13

⑩

270

Packaging

0.00



Packaging

Memo

0.00

Packaging

Identify and pack for shipping as per PPP D412-664-203
*****Ensure tube is not packaged if curing time is less than 12 hrs, see step 27
for application time & date *****
Time & date of packaging: I 11 hrs
Location: 103

11/5/13

W/O:		WORK ORDER CHANGES						
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Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

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Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Run Start

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop

Sequence ID/
Work Center IDOperation
DescriptionSet Up/
Run Hours

Tool ID

Tool #

Plan
CodeAccept
QtyReject
QtyReject
NumberInsp.
Stamp

280

QC21- Final Inspection - Work Order Release

0.00



QC

Memo

0.00

Quality Control

CK 11/05/13

ME
11-05-13

W/O:		WORK ORDER CHANGES						
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector	

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NOTE: Date & initial all entries

Picklist Print

Friday, May 06, 2011 3:46:40 PM

Page 1

Work Order ID: 69296

Parent Item: D412-664-203

Parent Item Name: Crosstube Aft



Start Date: 5/9/2011

Required Date: 5/27/2011

Start Qty: 1.00

Required Qty: 1.00

Comments: IPP Rev:E 04.02.16 Reformat; Added D3189-1 K/DS
 IPP Rev:F 06-03-29 Remove Comments on Pick List JLM
 IPP Rev:G 06.12.08 per ECN 886 EC
 IPP Rev:H 07-04-30 As per Rev D JLM
 IPP Rev:I 08-06-12 add comment in seq. 21 DD verified by:EC IPP rev
 G 11.04.21 DEO D412-664-243-E-1 EC verified by:DD

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
AN6-40A Bolt		Purchased	No			250	Each	114.0000	4	4			
<div> <div>Location</div> <div>Loc Qty</div> <div>Loc Code</div> </div> <div> <div>ST340</div> <div>80</div> <div></div> </div> <div> <div>117366</div> <div>80</div> <div></div> </div> <div> <div>ST343</div> <div>34</div> <div></div> </div> <div> <div>115905</div> <div>14</div> <div></div> </div> <div> <div>116549</div> <div>20</div> <div></div> </div>													
AN6-41A Bolt		Purchased	No			250	Each	67.0000	2	2			
<div> <div>Location</div> <div>Loc Qty</div> <div>Loc Code</div> </div> <div> <div>ST344</div> <div>67</div> <div></div> </div> <div> <div>115316</div> <div>17</div> <div></div> </div> <div> <div>117366</div> <div>50</div> <div></div> </div>													
AN960JD616 Washer	NAS1149D0663J	Purchased	No			250	Each	0.0000	18	18			

M117291 4/13 SP

W/O:		WORK ORDER CHANGES						
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector	

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Picklist Print

Friday, May 06, 2011 3:46:41 PM

Page 2

Work Order ID: 69296

Parent Item: D412-664-203

Parent Item Name: Crosstube Aft

Start Date: 5/9/2011

Required Date: 5/27/2011

Start Qty: 1.00

Required Qty: 1.00

D2896-1 Manufactured No 230 Each 21.0000 1 1



Support



ST 11-05-12

Location Loc Qty Loc Code

LG052

21

58356

3

67742

18

X1

D3189-1 Manufactured No 230 Each 24.0000 2 2



Chafing Shield



ST 11-05-12

Location Loc Qty Loc Code

FG

4

36065

4

LG053

20

63982

16

67587

4

X2

D3595-063-570 Manufactured No 230 Each 35.0000 2 2



RUBBER CUSHION



ST 11-05-12

Location Loc Qty Loc Code

FG

13

37971

1

42243

12

LG055

22

42243

1

63406

21

X2

Friday, May 06, 2011 3:46:41 PM

Shop Packet Print

Page 2

W/O:		WORK ORDER CHANGES						
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector	

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Page 3

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Parent Item Name: Crosstube Aft

Start Date: 5/9/2011

Required Date: 5/27/2011

Start Qty: 1.00

Required Qty: 1.00

D412-664-203TRN

Manufactured

No

110

Each

1.0000

1

1



Crosstube Turning Detail

Location

Loc Qty

Loc Code

LG003

1

67272

1

MS21042L6

Purchased

No

250

Each

322.0000

6

6



Nut

Location

Loc Qty

Loc Code

ST300

322

116548

22

117343

300

MS21920-28

Purchased

No

230

Each

74.0000

4

4



Clamp(per MIL-DTL-8783C)

Location

Loc Qty

Loc Code

FG

5

105884

5

LG050

69

116830

19

117344

50

MS21920-30

Purchased

No

230

Each

70.0000

2

2



clamp(per MIL-DTL-8783C)

Location

Loc Qty

Loc Code

LG050

20

109181

20

LG051

50

111258

50



11-5-7



11/5/13

6

4

x4

AT

11-05-12

x2

Friday, May 06, 2011 3:46:41 PM

Shop Packet Print

Page 3

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Item	Qty -243	Part Number	Description
1	X	D412-664-243	CROSSTUBE ASSEMBLY (412 HIGH AFT)
2	1	D6009-129	CROSSTUBE
3	2	D3595-063-570	RUBBER CUSHION
4	1	D2896-1	SUPPORT
5	2	D3189-1	CHAFING SHIELD
6	2	D2856-600-1009	ABRASION STRIP
7	4	MS21920-28	CLAMP
8	2	MS21920-30	CLAMP (OR MS21920-32)
9	A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299-947-100, TYPE II, CLASS 2 ADHESIVE)

GENERAL NOTES:

- MATERIAL: MANUFACTURED FROM D6009-129
FINISHED LENGTH = 124.100±0.020 (BEFORE BENDING/TRIMMING)
- FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
PAINT OUTSIDE PER DART QSI 005 4.2
- TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- UNITS: INCHES UNLESS OTHERWISE NOTED.
- BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
- IDENTIFICATION: SCRIBE DART PART NUMBER "D412-664-243" AND BATCH NUMBER ON INSIDE OF CUFF USING VIBRATING STYLUS.
- WEIGHT: 47.0 lbs (PER IIN-D212-664)
- PART IS SYMMETRIC ABOUT CENTERLINE.
- RUN CUTTER OFF PART. BLEND OUT EDGE LONGITUDINALLY, TRANSITION SHOULD BE SMOOTH.
- BEND PROGRESSIVELY WITH A MINIMUM OF 8 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6% BASED ON O.D.
- LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038.
- INSTALL D2896-1 SUPPORT USING 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 TO THE SURFACE OF D2896-1 THAT WILL BE IN CONTACT WITH THE CROSSTUBE PER QSI 015. LET CURE FOR 12 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.
- INSTALL MS21920-30 CLAMPS (OR -32) WITH D3595-063-570 RUBBER CUSHIONS TO SECURE THE D2896-1 SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMPS ARE OPPOSITE OF CROSSTUBE SUPPORT.
- INSTALL D2856-600-1009 ABRASION STRIPS WITH A 0.13 REF GAP ON BOTTOM SIDE OF CROSSTUBE PER QSI 035.
- EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.
- TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.

DEO ATTACHED

RELEASED
2009-10-29

E	REFORMAT/REVISE GENERAL NOTES; REORGANIZED VIEWS AND REFORMATTED DRAWING TO CURRENT STANDARDS; RELOCATED FLAG #6 PER PAR 08-046 (ZN A6-3); ADD TOLERANCE (ZN B6-3, C4-3, C8-3 & C5-3); MOVED TURNING DETAIL & UPDATED TOLERANCE TO SHEET 4.	RF	09.09.30
D	REMOVE D2732-058, CHANGE TO D3595-063-570	PH	07.03.09
C	REMOVE D2856-600-1087, ADD D2732-058 & MAGNOBOND 6398, MS21920-32 WAS MS21920-30	MB	06.10.27
B	ADD HOLES FOR COMPATABILITY WITH BHT/AA SKIDTUBES	PH	05.02.04
A	NEW ISSUE	PH	01.10.17
REV.	DESCRIPTION	BY	DATE
DESIGN	PH	DART AEROSPACE LTD	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED	PH	DRAWING NO.	REV. E
MFG. APPR.	PH	D412-664-243	SHEET 1 OF 4
APPROVED	PH	TITLE	SCALE
DE APPR.	PH	CROSSTUBE ASSEMBLY (412 HI AFT)	NTS
DATE	09.09.30	COPYRIGHT © 2001 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL, AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.	

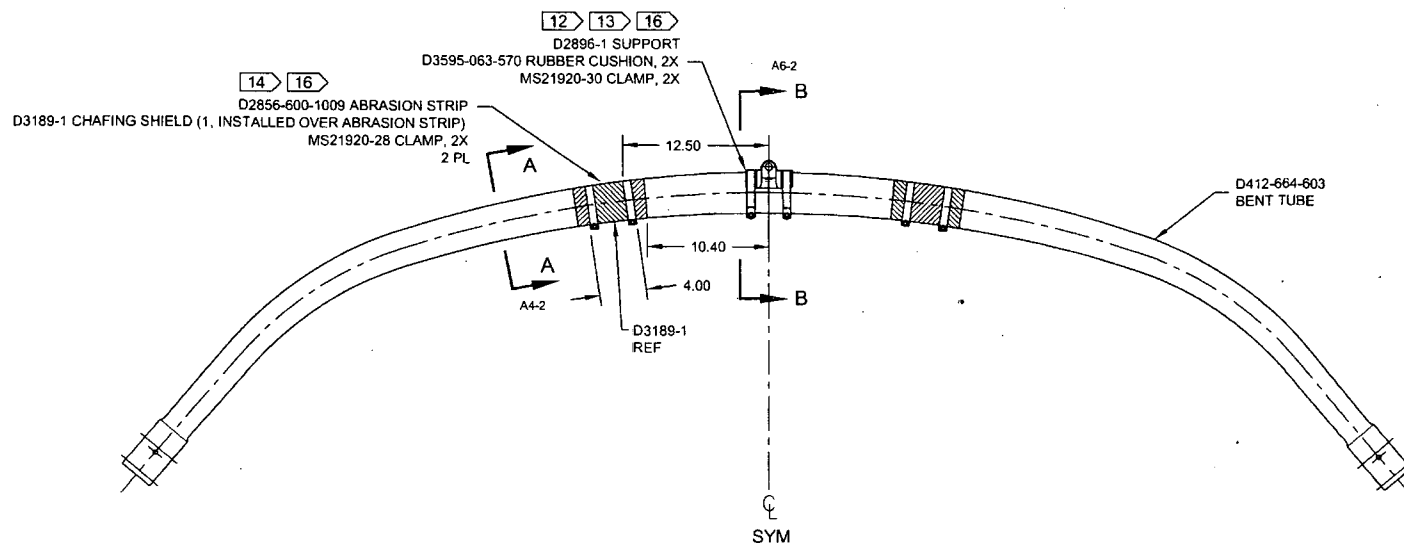
W/O:		WORK ORDER CHANGES						
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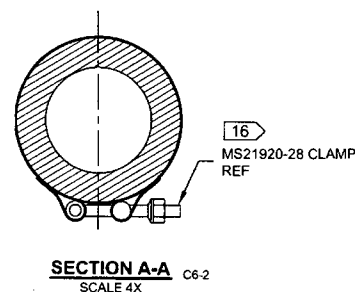
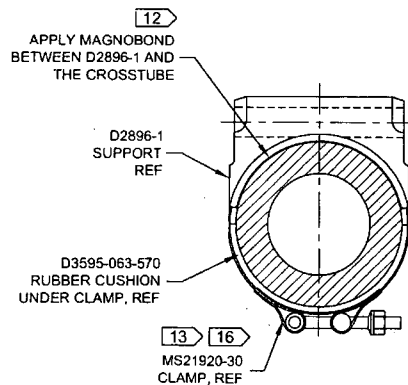
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NOTE: Date & initial all entries



D212-664-243
ASSEMBLY DETAIL



DEO ATTACHED

RELEASED
2009-10-28
N4

DESIGN	PH	DART AEROSPACE LTD	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED	9	DRAWING NO.	REV. E
MFG. APPR.	18	D412-664-243	SHEET 2 OF 4
APPROVED	18	TITLE	SCALE
DE APPR.	18	CROSSTUBE ASSEMBLY (412 HI AFT)	NTS
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DATE	STEP	PROCEDURE CHANGE		By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

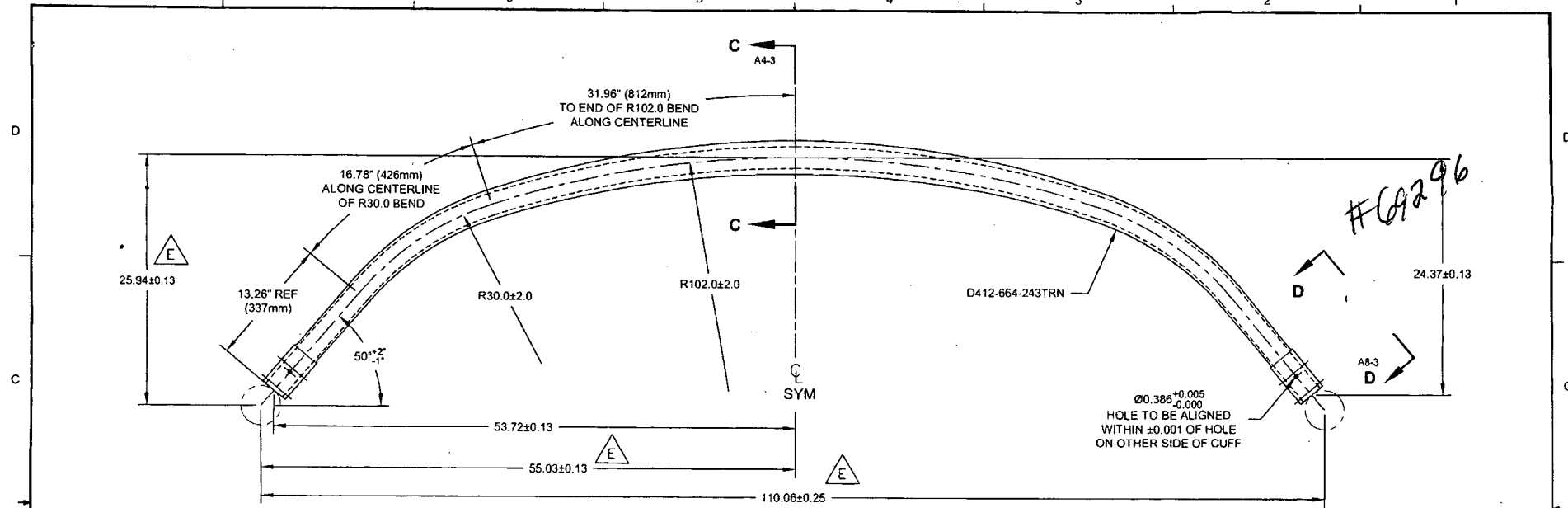
Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

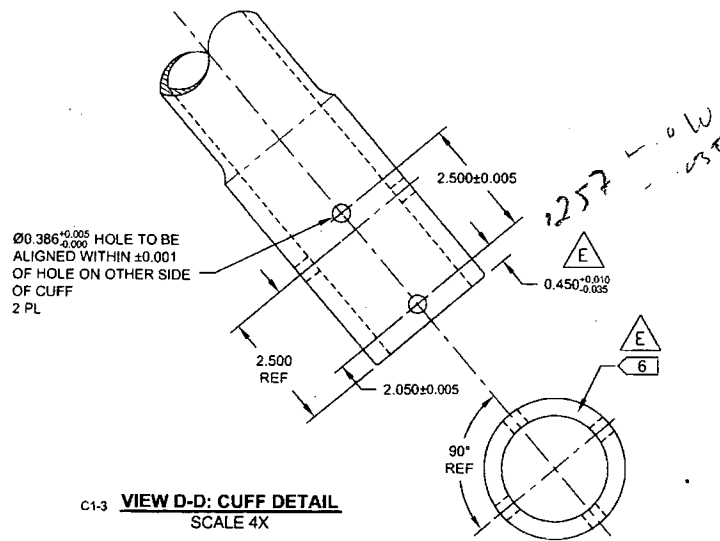
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DATE	STEP	Description of NC Section A	Corrective Action		Section B		Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date				

NOTE: Date & initial all entries

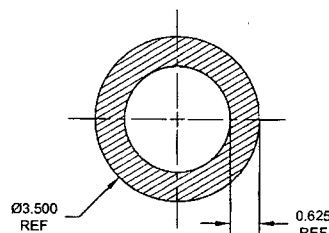
8 7 6 5 4 3 2 1



D412-664-603 10
BENDING AND DRILLING DETAIL



VIEW D-D: CUFF DETAIL
 SCALE 4X



SECTION C-C
 SCALE 4X

DEO ATTACHED

RELEASED
 2009-10-29

DESIGN	PH	DART AEROSPACE LTD
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA
CHECKED	92	DRAWING NO. REV. E
MFG. APPR.	SS	D412-664-243 SHEET 3 OF 4
APPROVED	AP	TITLE SCALE
DE APPR.	4	CROSSTUBE ASSEMBLY (412 HI AFT) NTS
DATE	09.09.30	COPYRIGHT © 2001 BY DART AEROSPACE LTD

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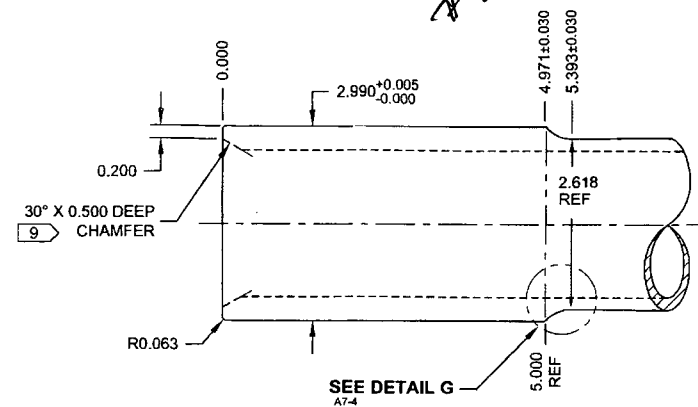
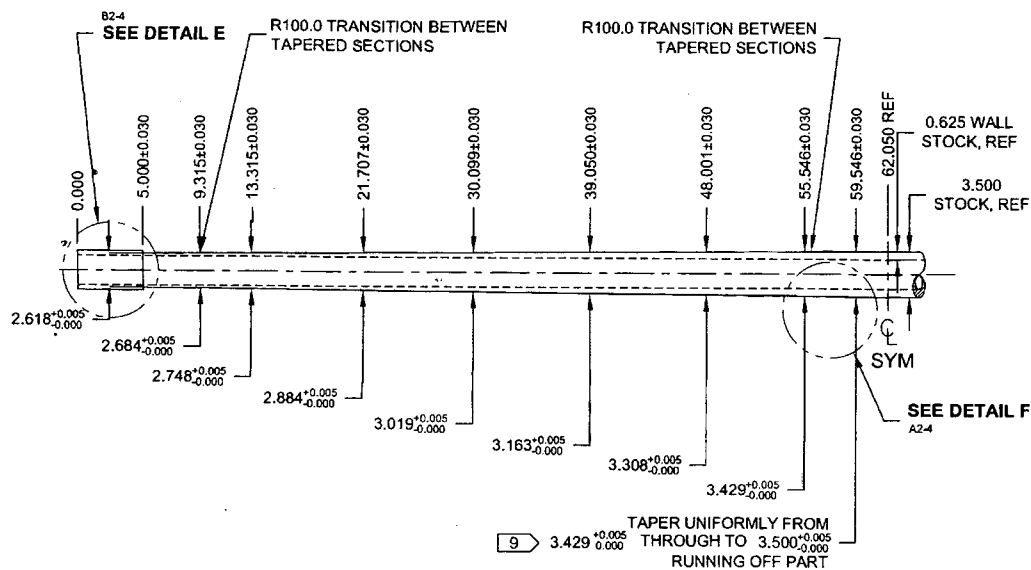
W/O:		WORK ORDER CHANGES						
DATE	STEP	PROCEDURE CHANGE		By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

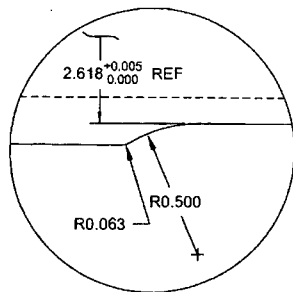
NCR:		WORK ORDER NON-CONFORMANCE (NCR)							
DATE	STEP	Description of NC Section A	Corrective Action		Section B		Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng		Sign & Date			

NOTE: Date & initial all entries

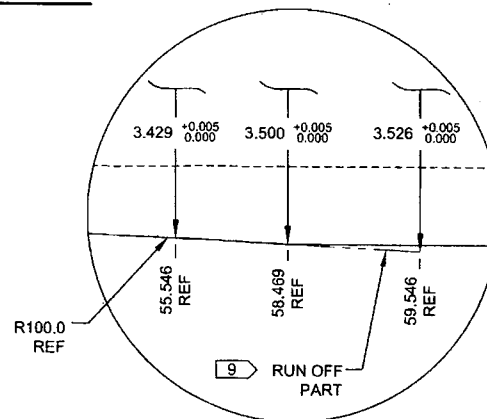


DETAIL E:
CROSSTUBE CUFF D8-4
SCALE 5X

D412-664-243TRN **TURNING DETAIL**



DETAIL G:
CUFF TRANSITION C2-4
SCALE 10X



DETAIL F:
TAPER RUN-OFF C4-4
NOT TO SCALE

DEO ATTACHED

RELEASED
2009-10-29

DESIGN	PH	DART AEROSPACE LTD	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED	90	DRAWING NO.	REV. E
MFG. APPR.	DS	D412-664-243	SHEET 4 OF 4
APPROVED	AP	TITLE	SCALE
DE APPR.	AP	CROSSTUBE ASSEMBLY (412 HI AFT)	NTS
DATE	09.09.30	COPYRIGHT © 2001 BY DART AEROSPACE LTD	
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W/O:		WORK ORDER CHANGES						
DATE	STEP	PROCEDURE CHANGE		By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)							
DATE	STEP	Description of NC Section A	Corrective Action		Section B		Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date				

NOTE: Date & initial all entries

DRAWING NO. D412-664-243	TITLE CROSSTUBE ASSEMBLY (412 HI AFT)	REV. E	DART AEROSPACE LTD ENGINEERING ORDER		D.E.O. NO. D412-664-243-E-1	SHEET NO. SHEET 1 OF 2	SCALE NTS
DRAWN	CHECKED	MFG. APPR.	APPROVED		DE APPR.		
DATE 11.03.31	DATE 11/03/31	DATE 11.03.31	DATE 11/03/31		DATE 11.03.31		

PURPOSE:

REMOVED ABRASION STRIP IN FAVOR OF A THIN LAYER OF PROSEAL 890.

CHANGE:

PARTS LIST IS AMENDED AS FOLLOWS:

IS:

Item	Qty -243	Part Number	Description
6	0	D2856-600-1009	ABRASION STRIP

WAS:

6	2	D2856-600-1009	ABRASION STRIP
---	---	----------------	----------------

NOTES 2 AND 14, SHEET 1 ARE AMENDED AS FOLLOWS:

IS:

- 2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
MASK UNDERSIDE OF CROSSTUBE AS SHOWN (HATCHED AREA)
PAINT OUTSIDE PER DART QSI 005 4.2
AFTER PAINTING, APPLY CLEAR COAT ON HATCHED AREA
- 14) APPLY A THIN COAT OF PROSEAL 890 ON INSIDE CONCAVE SURFACE OF D3189-1
CHAFING SHIELD AND LET CURE PER MANUFACTURER'S INSTRUCTIONS. INSTALL
PROSEAL D3189-1 CHAFING SHIELD ONTO CROSSTUBE BY APPLYING A THIN COAT OF
PROSEAL 890 ONTO CROSSTUBE. BE SURE TO ELIMINATE ANY AIR GAPS.

WAS:

- 2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
PAINT OUTSIDE PER DART QSI 005 4.2
- 14) INSTALL D2856-600-1009 ABRASION STRIPS WITH A 0.13 REF GAP ON BOTTOM SIDE OF
CROSSTUBE PER QSI 035.

RELEASED
2011-04-07
SW

W/O:		WORK ORDER CHANGES						
DATE	STEP	PROCEDURE CHANGE		By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

DRAWING NO. D412-664-243	TITLE CROSSTUBE ASSEMBLY (412 HI AFT)	REV. E	DART AEROSPACE LTD ENGINEERING ORDER	D.E.O. NO. D412-664-243-E-1	SHEET NO. SHEET 2 OF 2	SCALE NTS
DRAWN <i>[Signature]</i>	CHECKED <i>[Signature]</i>	MFG. APPR. <i>[Signature]</i>	APPROVED <i>[Signature]</i>	DE APPR. <i>[Signature]</i>		
DATE 11.03.31	DATE 11.03.31	DATE 11.03.31	DATE 11.03.31	DATE 11.03.31		

IS:

D3189-1 CHAFING SHIELD (1, INSTALLED OVER PROSEAL 890)
MS21920-28 CLAMP, 2X
2 PL

D412-664-603
BENT TUBE

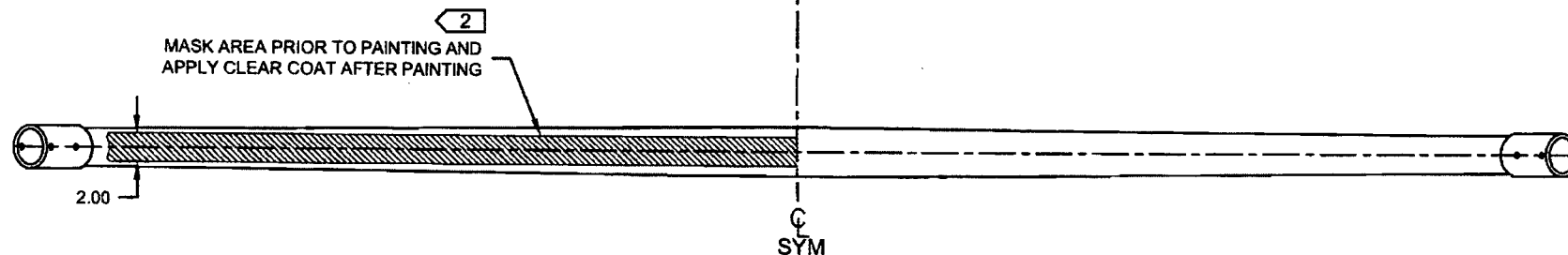
2.00
1.00

WAS:

D2856-600-1009 ABRASION STRIP
D3189-1 CHAFING SHIELD (1, INSTALLED OVER ABRASION STRIP)
MS21920-28 CLAMP, 2X
2 PL

D3189-1
REF

**D412-664-243
ASSEMBLY DETAIL**



W/O:		WORK ORDER CHANGES						
DATE	STEP	PROCEDURE CHANGE		By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

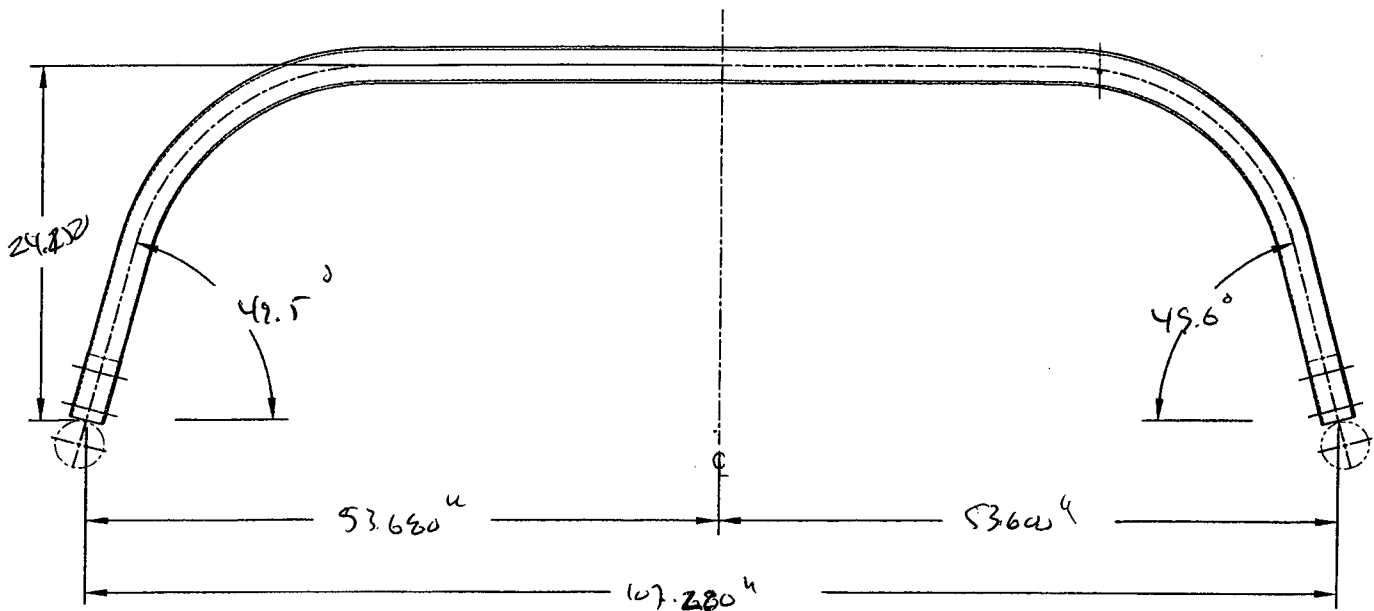
Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

DART AEROSPACE LTD		Work Order:	69296
Description: Crosstube High Aft (412)		Part Number:	D412-664-203
Inspection Dwg: D412-664-243 Rev: E			Page 1 of 1

Required Dimension	Min	Max
Height	24.24	24.50
1/2 Span	53.59	53.85
Angle	49	52
Total Span	107.18	107.70



Comments

QC15 Inspection	S u/05/09
Date	

Rev	Date	Change	Revised by	Approved
A	07.02.06	New Issue	KJ/JM	
B	07.05.08	Dimensions updated per Dwg rev. D	KJ/JLM	
C	10.02.02	Dwg Rev updated	KJ	

W/O:		WORK ORDER CHANGES						
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector	

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries



LIQUID PENETRANT TEST REPORT

P- 05607

PAGE 1 OF 1

TIME 8 AM ☒ PM ☐

CLIENT DART AEROSPACE

DATE MAY-10-2011

ATTENTION Lynda Lacelle / K. Hantala / JAW / MATT

ACUREN JOB NO. 188-11-02123

ADDRESS 1270, ABERDEEN RD

PO/NO. 14045

HAWKESBURY ON

WORK LOCATION AS ADDRESS

ACCEPTANCE STD. ASIM 417/QST-038

REV./DATE

2008

PROJECT

WET FLUORESCENT LIQUID PENETRANT INSPECTION ON 5" CROSSTUBES

ITEM(S) EXAMINED

SEE BELOW

JOB DESCRIPTION

PROCEDURE NO. LT-003

REV./DATE 2008

TECHNIQUE NO. LT-003

REV./DATE 2008

PART NO.

MATERIAL ALUMINUM

THICKNESS

N/A

SCOPE

PERFORMED A WET FLUO. L.P.I. ON 100% OF THE EXTERNAL SURFACE ON 5" CROSSTUBES

TEST DETAILS

METHOD	<input checked="" type="checkbox"/> FLUORESCENT	<input type="checkbox"/> VISIBLE	<input checked="" type="checkbox"/> WATER WASH	<input type="checkbox"/> SOLVENT REMOVABLE	<input type="checkbox"/> POST EMULSIFIED
FAMILY BRAND	MAGNAFLUX		BLACK LIGHT S/N	13798	OUTPUT > 1000 μ W/cm ²
PENETRANT	2L-67	MINIMUM DWELL TIME	10	MIN.	FLASHLIGHT
PENETRANT REMOVER	H ₂ O	MINIMUM DRY TIME	>10	MIN.	OTHER
DEVELOPER	SKD-32	MINIMUM DWELL TIME	10	MIN.	LIGHT METER S/N
DEVELOPER TYPE	<input checked="" type="checkbox"/> NON AQUEOUS	<input type="checkbox"/> AQUEOUS	<input type="checkbox"/> DRY	CAL DUE DATE	

TEST SURFACE

SURFACE CONDITION	<input type="checkbox"/> AS GROUND	<input type="checkbox"/> AS WELDED	<input type="checkbox"/> MACHINED	<input type="checkbox"/> SHOT BLASTED	<input checked="" type="checkbox"/> CLEAN BARE METAL
SURFACE TEMPERATURE	<input type="checkbox"/> < -4°C/ 20°F	<input type="checkbox"/> -4°C/ 20°F TO 10°C/ 50°F	<input checked="" type="checkbox"/> 10°C/ 50°F TO 52°C/ 125°F	<input type="checkbox"/> > 52°C/ 125°F	

RESULTS-

(☐ METRIC ☐ IMPERIAL)

ITEM	COMMENTS	ACCEPT	REJECT
1	CROSSTUBE W.O.I.D. 69296	<input checked="" type="checkbox"/>	
2	CROSSTUBE W.O.I.D. 69297	<input checked="" type="checkbox"/>	
3	CROSSTUBE W.O.I.D. 69300	<input checked="" type="checkbox"/>	
4	CROSSTUBE W.O.I.D. 67554	<input checked="" type="checkbox"/>	
5	CROSSTUBE W.O.I.D. 67556	<input checked="" type="checkbox"/>	
ITEM ID D412-664-203 AFT			
ITEM ID D412-664-203 AFT			
ITEM ID D412-664-203 AFT			
ITEM ID D412-664-203 AFT			
ITEM ID D412-664-203 AFT			
ITEM ID D412-664-203 AFT			

Scope of Services

The agreement of Acuren Group Inc. to perform services extends only to those services provided for in writing. Under no circumstances shall such services extend beyond the performance of the requested services. It is expressly understood that all descriptions, comments and expressions of opinion reflect the opinions or observations of Acuren Group Inc. based on information and assumptions supplied by the owner/operator and are not intended nor can they be construed as representations or warranties. Acuren Group Inc. is not assuming any responsibilities of the owner/operator and the owner/operator retains complete responsibility for the engineering, manufacture, repair and use decisions as a result of the data or other information provided by Acuren Group Inc. In no event shall Acuren Group Inc.'s liability in respect of the services referred to herein exceed the amount paid for such services.

Standard of Care

In performing the services provided, Acuren Group Inc. uses the degree, care and skill ordinarily exercised under similar circumstances by others performing such services in the same or similar locality. No other warranty, expressed or implied, is made or intended by Acuren Group Inc.

SIGNATURES

CLIENT REPRESENTATIVE

Dan Tittley

TECHNICIAN (SIGNATURE):

J. Desrosiers

NAME (PRINT):

J. Desrosiers

CGSB LEVEL

2

SNT LEVEL

2

CGSB REG. NO.

3049

CGSB LEVEL

SNT LEVEL

CGSB REG. NO.

DTR # 244650

REPORT

REVIEWED BY:

NAME

INITIALS